GENERAL INDEX[1]

A

Abnormality, general aspects of leaf, 754
Absorption of sulphur dioxide by alfalfa and its relation to leaf injury, 291
  spectra of alpha and beta carotenes and lycopene, 375
Accumulation of boron by reciprocally grafted plants, 411
  of starch, 58
Acid hydrolysis, 77
  pantothenic as nutrilite for green plants, 559
Acids, fatty, before and after hydrolysis, 717
  organic, 458
Acalypha, 793
Address list, international, 409
Adsorption with decolorizing carbon, 139
Age of tissue, effect on osmotic pressure and water content, 675
Albinism, 182
Alcoholic extraction, 383
  storage, 144
ALDRICH, W. W., Influence of different quantities of moisture in a heavy soil on rate of growth of pears, 309
Alfalfa, absorption of sulphur dioxide and relation to leaf injury, 291
  salt concentration and reversibility of ice-formation related to hardiness, 403
Algae and their life relations, JOSEPHINE E. TILDEN, 825
Allium cepa, 209
Alpha carotene, 375
Aluminum, toxicity on seedlings, and action of certain ions in elimination of toxic effects, 1
American ferns, EDITH A. ROBERTS and JULIA R. LAWRENCE, 826
Amide nitrogen, 85, 396
Amino nitrogen, 82, 87, 394, 395
  nitrogen, determination in plant extracts, 135
Ammonia, 136
  organic acids as direct receptors, 458
Amylose, alpha and beta from starch, 715
Anabolic processes, soluble nitrogen as measure of available nitrogen, 355
Anaesthetics, 453
Analysis, chemical, of plant tissues, 383
Anatomical structure, 64
ANDERSON, D. B., Laboratory plant physiology, 825
Annual election, 581
Apparatus, 329, 330
  capillary siphon, 173
  constant level reservoir, 171
  cryoscopy, 663
  for control of nutrient solutions, 169
  for electrodialysis, 714
  for measuring leaf areas, 569
  for photosynthesis and respiration, 94
  for potential measurements, 31
  electrode chamber, 29
  reservoir connections, 174
  siphon shield, 176
Apple and pear fruits, comparison of changes, 594
  trees, fruiting relationships, 483
  varieties, physiology, 49
Area, leaf, 546
Areas, leaf, photoelectric apparatus for measuring, 569
Artemia salina, 429
Artichoke (Jerusalem), 414
Ash, 717, 746
Asparagine and nitrogen metabolism of plants, 447
Assimilation, effect of CO_2 concentration, 248
AUSTIN, J. P., Some effects of the photoperiod on development of *Impatiens balsamea*, 545
AUSTIN, STANLEY, Effects of exfloration on plant metabolism, 225
Avena sativa, temperature as a predetermining factor in development, 269
Award, STEPHEN HALES, 200
  life membership, 200
Axis, development of main and length of photoperiod, 549

[1] Papers published in PLANT PHYSIOLOGY are indexed in *The Agricultural Index*, The H. W. Wilson Co., New York.

B

BAKKE, A. L., Thermal conductivity of stored oats with different moisture content, 521
Balance, carbon dioxide, at high light intensities, 93
BARCLAY, G., Effect of titanous chloride on formation of chlorophyll in *Zea mays*, 821
Barley seedlings, development of chlorophyll and carotenoid pigments, 365
BARNES life membership award, 200
Bases, 733
Basic nitrogen, 86
BĚLEHRÁDEK, JAN, Temperature and living matter, 585
Beta carotene, 375
Bibliography, low temperature relations, R. B. HARVEY, 409
Biochemical laboratory methods, C. A. MORROW and W. M. SANDSTROM, 410
  phases of oleoresin production, 537
Biochemistry, annual review, 584
Bioelectric potential at flux equilibrium, kinetics of an intracellular system, 681
BLACKMAN'S law of limiting factors applied to photosynthesis, 245
BLAIR, G. Y., Accumulation of boron by reciprocally grafted plants, 411
Board, editorial, 200
Boron accumulation by reciprocally grafted plants, 411
Botanical congress, international, delegate, 409
  congress, international, 823
Buckwheat, 21
Budding and length of photoperiod, 547
Buffer capacity in relation to hardiness of plants, 149
BURR, G. O., Carbon dioxide balance at high light intensities, 93

C

Calcium deficiency effects on *Pisum sativum*, 811
Capacity, buffer, in relation to hardiness of plants, 149
Capillary siphons, 173
Carbohydrates, effects, 453
  determination, 387
  in *Elymus ambiguus* and *Muhlenbergia gracilis*, 727
Carbon dioxide balance at high light intensities, 93
Carotene and xanthophyll in pineapples, 187
  colorimetric determination in plant tissues, 325
Carotenes, alpha and beta, absorption spectra, 375
Carotenoid pigments, development in barley seedlings, 365
Cell E.M.F.'s, principle of summation, 209
  formation, stone, in pear fruits, 587
  oxidation and output of electric energy, 27
  physiology, 824
Cells, osmotic quantities of plants in given phases, 115
  plant, estimation of osmotic values of, 553
Chairmen, committee, 824
Change of tropic response, 196
Changes in nitrogen compounds in the wheat grain at different stages of development, 499
  seasonal, in composition of oak leaves, 739
Chemical analysis of plant tissues, 383
  methods committee, 409
Chemistry, stock-scion, and fruiting relationships in apple trees, 483
Cherries, observations on cracking, 763
CHICHESTER, D. F., Colorimetric determination of carotene in plant tissue, 325
Chlorate, sodium, in weed control, 699
Chloride, effect of titanous on formation of chlorophyll in *Zea mays*, 821
Chlorophyll content in pineapple plants, 159
Chlorophyll development in barley seedlings, 365
  effect of titanous chloride on formation, in *Zea mays*, 821
  formation and the beginning of photosynthesis, 401
Citrus limonia, 413

seedlings grown from x-rayed seed, growth modifications in, 179
Clearing methods, 387
CLEMENTS, F. E., Studies of the effect of artificial wind on growth and transpiration in *Helianthus annuus*, 613
Further studies of elongation and expansion in *Helianthus* phytometers, 637
COLBY, H. L., Stock-scion chemistry and fruiting relationships in apple trees, 483
Color with iodine, 716
Colorimetric determination of carotene in plant tissues, 325
Committee chairmen, 824
life membership, 823
chemical methods, 409
reports, 383, 387, 393
editorial, 408
finance, 409
program, 200
Compensation point, 107
Composition, chemical, of terminal shoots, 62
of oak leaves, seasonal changes, 739
Compounds, determination of nitrogen in simple, 393
Concentration, effect of CO_2 on assimilation, 248
Concentration of salt and hardiness of alfalfa, 403
Conductivity, electrical, 716
thermal, of oats, 521
Congress delegate, International Botanical, 409
International Botanical, 823
Containers and distribution of roots, 511
Content, chlorophyll, in pineapple plants, 159
moisture, and thermal conductivity of oats, 521
sucrose, of prunes, 575
sulphur, of plants, 529
water, of prairie plants, 661
Continuous flow of nutrient solutions, mechanism for, 169
Controlled continuous flow of nutrient solutions, mechanism for, 169
Control of weeds and sodium chlorate, 699
COOPER, W. C., Hormones in relation to root formation on stem cuttings, 789
Corn, 6, 401
polysaccharides in sweet, 713
tissues, solubility of potassium in, 565
Corresponding members, 199
Cost of reprints, 201
Cracking of cherries, 763
CRAFTS, A. S., Physiological problems connected with the use of sodium chlorate in weed control, 699
CRUMP, L. M., Problems in soil microbiology, 825
Cryoscopy, apparatus, 663
CUTLER, D. S., Problems in soil microbiology, 825
Cuttings, hormones in relation to root formation on stem, 789

D

DAVIDSON, O. W., Determination of nitrogenous fractions in vegetative tissue of peach, 73
DAY, DOROTHY, Some chemical aspects of calcium deficiency effects on *Pisum sativum*, 811
Deemulsifiers, 385
Deficiency, calcium, effects on *Pisum sativum*, 811
Defoamers, 385
Deleading, 387
Delegate, International Botanical Congress, 409
Determination, colorimetric of carotene in plant tissue, 325
of amino nitrogen in plant extracts, 135
of carbohydrates, 387
of nitrogen in relatively simple compounds, 393
of nitrogenous fractions in vegetative tissue of peach, 73
of starch in plant tissue, 579
Determinations, sugar, 388
Determining nitrogen in plants, 355
Development of *Avena sativa*, 269
of cholorphyll and carotenoid pigments in barley seedlings, 365
of *Impatiens balsamea*, 545

of main axis and length of photoperiod, 549
nitrogen compounds in wheat grain at different stages, 499
DEVRIES, HUGO, obit., 584
DEXTER, S. T., Growth, organic nitrogen fractions, and buffer capacity in relation to hardiness of plants, 149
Salt concentration and reversibility of ice-formation as related to hardiness of alfalfa, 403
Dextrine, 389
Dextrose-levulose ratio of prunes, 575
Dioxide, carbon, balance at high light intensities, 93
Distillation with solid calcium oxide, 139
Distribution of roots in porous and nonporous plant containers, 511
Dormancy of lettuce seeds and light, 193
Drying, heat, 384
Duplication, 184

E

EATON, F. M., Accumulation of boron by reciprocally grafted plants, 411
Edestin, 503
Editorial board, 200
committee, 408
Effects of photoperiod on development of *Impatiens balsamea*, 545
EISENMENGER, W. S., Toxicity of aluminum on seedlings and action of certain ions in elimination of toxic effects, 1
Election, annual, 581
Electric energy, linkage between output by polar tissues and cell oxidation, 27
Electrodialysis, apparatus for, 714
Electromotive force, principle of summation of cell, 209
Elongation in *Helianthus* phytometers, 637
Elymus ambiguus, seasonal march of carbohydrates, 727
EMMERT, E. M., Method for quickly determining nitrogen in plants, and soluble nitrogen as a measure of nitrogen available for anabolic processes, 355
Endowments, 201
Energy, electric, linkage between output by polar tissues and cell oxidation, 27
ENSIGN, M. R., Factors influencing growth and yield of potatoes in Florida, 465
Enzymatic hydrolysis, 78
Equilibrium, flux, kinetics of an intracellular system for respiration and bioelectric potential, 681
water, in plant tissues, 781
ERNEST, ELIZABETH C. M., Factors rendering the plasmolytic method inapplicable in the estimation of osmotic values of plant cells, 553
Errata, 824
Estimation of osmotic values of plant cells, 553
Excretion, A. FREY-WYSSLING, 202
Exfloration, effects on plant metabolism, 225
Exosmosis method, 149
Expansion in *Helianthus* phytometers, 637
Extracting, method, 74
Extraction, 384
alcoholic, 135, 383
water, 135
of pigments, 326
Extractives, water and 80 per cent. alcohol as, 145
Extract, nitrogen-free, 746
Extracts, determination of amino nitrogen in plants, 135

F

Factor, temperature as a predetermining in development of *Avena sativa*, 269
Factors, limiting, and photosynthesis, 245
Fasciation, 183
Ferns, American, EDITH A. ROBERTS and JULIA R. LAWRENCE, 826
Fertilization, nitrogen, and chlorophyll content in pineapple plants, 159
Fiber, crude, 746
Fig, 793
Finance committee, 409
FINCH, A. H., Physiology of apple varieties, 49
FISHER, R. A., Statistical methods, 202
Flax, 246
Flocculation by salts, 716
Florida, growth and yield of potatoes, 465

Flow of nutrient solutions, mechanism for controlled continuous, 169
streamline, and movement of solutes in transpiration stream, 773
Flowering and length of photoperiod, 547
premature, 181
Flux equilibrium, kinetics of an intracellular system for respiration and bioelectric potential, 681
Formation of chlorophyll and beginning of photosynthesis, 401
of chlorophyll in *Zea mays*, 821
root, on stem cuttings, hormones in relation, 789
stone cell, in pear fruits, 587
Fractionation of nitrogen, 393
Fractions, nitrogenous, in vegetative tissue of peach, 73
organic nitrogen in relation to hardiness of plants, 149
FRAZER, JOHN, Sulphur content of plants, 529
FREAR, D. E. H., Photoelectric apparatus for measuring leaf areas, 569
Freezable water equilibrium in plant tissues, 781
Freezing, 383
FREY-WYSSLING, A., Die Stoffausscheidung der höheren Pflanzen, 202
Frog nerve, 220
Fructose, separation, 389
Fruiting relationships in apple trees, 483
Fruits, stone cell formation in pear, 587
Fuel oil, effects on plants, 817
FULLER, G. D., Some effects of fuel oil on plants, 817

G

GERRY, ELOISE, Biochemical phases of oleoresin production, 537
Gliadin, 499
Glucose and fructose, separation, 389
Glutenin, 499
GOEBEL, KARL RITTER VON, biographical sketch, 203
portraits, opposite pp. 203, 205
Grafted plants, 411
Grain, wheat, nitrogen compounds, 499
Grapefruit, 179
Grazing use, seasonal march of carbohydrates in *Elymus ambiguus* and *Muhlenbergia gracilis*, and their reaction under moderate, 727
GREATHOUSE, G. A., Unfreezable and freezable water equilibrium in plant tisues as influenced by sub-zero temperatures, 781
Green plants, pantothenic acid as a nutrilite, 559
Grimmia montana, photosynthesis, 803
Growth, character of terminal shoot, 54
in *Helianthus annuus*, effect of artificial wind, 613
in relation to hardiness of plants, 149
modifications in citrus seedlings grown from x-rayed seed, 179
of pears, influence of different quantities of moisture in a heavy soil on rate, 309
of plants, 729
of oak leaves, 739
of potatoes in Florida, 465

H

HALES, STEPHEN, award, 200
HALL, J. A., Biochemical phases of oleoresin production, 537
HARDER'S concept of relative minimum and photosynthesis, 245
Hardiness of alfalfa, salt concentration, and reversibility of related ice formation, 403
of plants, growth, organic nitrogen fractions and relation of buffer capacity, 149
Hardness, of pear and apple, 602
HARVEY, R. B., Low temperature relations bibliography, 409
HASKINS, C. P., Growth modifications in citrus seedlings grown from x-rayed seed, 179
HASKINS, H. D., Distribution of roots in porous and non-porous plant containers, 511
Heat drying, 384
Helianthus annuus, 413
tuberosus, 413
annuus, effect of artificial wind on growth and transpiration, 613
annuus, effect of solar radiation on transpiration, 341

phytometers, elongation and expansion, 637
Herbage, 731
HILL, G. R., JR., Absorption of sulphur dioxide by alfalfa and its relation to leaf injury, 291
HIMMEL, W. J., A case of change of tropic response, 196
Hormones in relation to root formation on stem cuttings, 789
HUBBARD, MALVERN, Effect of titanous chloride on the formation of chlorophyll in *Zea mays*, 821
Humidity as a factor influencing osmotic pressure, 671
Humin nitrogen, 86
HUTCHINGS, L. R., Streamline flow and movement of solutes in transpiration stream, 773
Hydrolysis of sucrose, 388

I

Ice-formation and hardiness of alfalfa, 403
Impatiens balsamea, effects of photoperiod on development, 545
Incipient plasmolysis, 554
Injury to leaves and absorption of sulphur dioxide in alfalfa, 291
INMAN, O. L., Formation of chlorophyll and beginning of photosynthesis, 401
Effect of titanous chloride on formation of chlorophyll in *Zea mays*, 821
Intensities, light, carbon dioxide balance at high, 93
of light, 254
International address list, 409
Botanical Congress, 823
Botanical Congress delegate, 409
Intracellular system for respiration and bioelectric potential at flux equilibrium, 681
Iodine, color, 716
Ions, action of in elimination of toxic effects of aluminum on seedlings, 1
Isolation of starch in plant tissue, 579

J

JONES, L. H., Distribution of roots in porous and non-porous plant containers, 511

K

KERTESZ, Z. I., Observations on the cracking of cherries, 763
Kinetics of an intracellular system for respiration and bioelectric potential at flux equilibrium, 681

L

Laboratory manual of cell and tissue physiology of plants, SIEGFRIED STRUGGER, 824
methods, biochemical, 410
plant physiology, B. S. MEYER and D. B. ANDERSON, 825
Lakes of high magnesium sulphate content and salt tolerance of *Ruppia maritima*, 425
LAL, K. N., Limitations of BLACKMAN'S law of limiting factors and HARDER'S concept of relative minimum as applied to photosynthesis, 245
Lantana, 793
LAWRENCE, JULIA R., American ferns, 826
LEADBEATER, MARGARET R., Some effects of fuel oil on plants, 817
Leaf areas, photoelectric apparatus for measuring, 569
formation, peloric, 185
injury and absorption of sulphur dioxide in alfalfa, 291
structure, modification by x-rays, 753
Leaves, oak, growth and seasonal changes in composition, 739
LÉEMANN, A. C., Pansoma, 826
Lemon, 179, 415
experiments, 789
Lettuce seeds, light as a factor influencing the dormancy, 193
Leucosin, 503
Levulose-dextrose ratio of prunes, 575
LEWIS, M. R., Influence of different quantities of moisture in a heavy soil on rate of growth of pears, 309
Life membership, BARNES, 200
membership committee, 823
relations of algae, JOSEPHINE E. TILDEN, 825
Light as a factor influencing the dormancy of lettuce seeds, 193

intensities, carbon dioxide balance, 93
intensity, 254
Lignocellulose, 587
Lime, 179
Limiting factors and photosynthesis, 245
Linkage between output of electric energy in polar tissues and cell oxidation, 27
LINK, K. P., Isolation and determination of starch in plant tissue, 579
List, international address, 409
Living matter and temperature, JAN BĚLEHRÁDEK, 585
LLOYD, F. E., biographical sketch of KARL RITTER VON GOEBEL, 203
Localization of injuries induced by x-rays, 760
LONG, FRANCES L., Further studies of elongation and expansion in *Helianthus* phytometers, 637
Longleaf pine, 537
Low temperature relations bibliography, R. B. HARVEY, 409
LUND, E. J., Linkage between output of electric energy by polar tissues and cell oxidation, 27
Lycopene, absorption spectra of, 375

M

MACKINNEY, G., Development of the chlorophyll and carotenoid pigments in barley seedlings, 365
Absorption spectra of alpha and beta carotenes and lycopene, 375
MCCARTY, E. C., Seasonal march of carbohydrates in *Elymus ambiguus* and *Muhlenbergia gracilis*, and their reaction under moderate grazing use, 727
MCKAY, ELIZABETH, Salt tolerance of *Ruppia maritima* in lakes of high magnesium sulphate content, 425
Photosynthesis in *Grimmia montana*, 803
MCLEAN, R. C., Streamline flow and movement of solutes in transpiration stream, 773
MAGISTAD, O. C., Relationship between nitrogen fertilization and chlorophyll content in pineapple plants, 159
Carotene and xanthophyll in pineapples, 187
Magnesium sulphate content, salt tolerance of *Ruppia maritima* in lakes of high, 425
March, seasonal, of carbohydrates, 727
MARSH, G., Kinetics of an intracellular system for respiration and bioelectric potential at flux equilibrium, 681
MARTIN, E. V., Effect of solar radiation on transpiration of *Helianthus annuus*, 341
Studies of the effects of artificial wind on growth and transpiration in *Helianthus annuus*, 613
Matter, living, and temperature, JAN BĚLEHRÁDEK, 585
Maturation period, 748
Mechanism for controlled continuous flow of nutrient solutions, 169
Meeting, St. Louis, 408, 581, 823,
Minneapolis, 581
Pittsburgh, 199
Summer, 199
Meetings, summer, 407
MEHRLICH, F. P., A mechanism for controlled continuous flow of nutrient solutions, 169
Melting point of osazones, 717
Membership committee, life, 823
life, 200
Members, corresponding, 199
Mesophyll structure, 656
Metabolism, effects of exfloration on plant, 225
nitrogen, of plants, rôle of asparagine, 447
Methods, biochemical laboratory, C. A. MORROW and W. M. SANDSTROM, 410
committee, chemical, 409
plasmolytic, and estimation of osmotic values of plant cells, 553
statistical, 202
MEYER, B. S., Laboratory plant physiology, 825
Microbiology of soil, D. S. CUTLER and L. M. CRUMP, 825
MILLER, E. S., Carbon dioxide balance at high light intensities, 93
Absorption spectra of alpha and beta carotenes and lycopene, 375
Minimum, relative, and photosynthesis, 245
Minneapolis meeting, 581

Minnesota section, 408
Modification, structural, of sunflower, 652
Modifications of growth in citrus seedlings grown from x-rayed seed, 179
Moisture content and thermal conductivity of oats, 521
in a heavy soil, and rate of growth of pears, 309
soil, as a factor influencing osmotic pressure, 671
MOORE, C. N., Growth modifications in citrus seedlings grown from x-rayed seed, 179
MORRIS, V. H., Solubility of potassium in corn tissues, 565
MORROW, C. A., Biochemical laboratory methods, 410
Movement of solutes in the transpiration stream, 773
Muhlenbergia gracilis, carbohydrates, 727
MURNEEK, A. E., Physiological rôle of asparagine and related substances in nitrogen metabolism of plants, 447

N

Nations can live at home, O. W. WILLCOX, 827
NEBEL, B. R., Observations on the cracking of cherries, 763
Nerve, frog, 220
New England section, 582
NICHOLS, P. F., Notes on the sucrose content and dextrose-levulose ratio of California dried prunes, 575
NIEMANN, CARL, Isolation and determination of starch in plant tissue, 579
Nitrate nitrogen, 86, 396
Nitrates, 393
Nitrogen, amide, 85
amino, 87
ammonium, 82
basic, 86
cyanogenetic, 76
compounds in wheat, 499
content of tree tissues, 486
determination of amino in plant extracts, 135
determination in plants, 355
determination in relatively simple compounds, 393
fertilization and chlorophyll content in pineapple plants, 159
fractions, organic, in relation to hardiness of plants, 149
humin, 86
nitrate, 86
metabolism of plants and rôle of asparagine, 447
nutrient, response to high and low, 67
total soluble, 84
Nitrogenous fractions in vegetative tissue of the peach, 73
NOGUCHI, Y., Modification of leaf structure by x-rays, 753
Non-porous plant containers, distribution of roots, 511
Nutrient solutions, mechanism for controlled continuous flow, 169
Nutrilite for green plants, pantothenic acid as, 559

O

Oak leaves, growth and seasonal changes in composition, 739
Oaks, stomata and transpiration, 795
Oats, 269
thermal conductivity of, 521
Oil, fuel, effects on plants, 817
Oleoresin production, 537
Orange, 179
Organic nitrogen fractions in relation to hardiness of plants, 149
Osazones, melting point, 717
Osmotic pressure and water content of prairie plants, 661
quantities of plant cells in given phases, 115
values of plant cells, estimation, 553
Oxidation, 452
cell, and output of electric energy, 27

P

Pansoma, A. C. LEEMANN, 826
Pantothenic acid as a nutrilite for green plants, 559
Paradise apple stock, 483
PARKER, M. W., Physical and chemical properties of the soluble polysaccharides in sweet corn, 713

Pea, Canada field, 811
Peach, determination of the nitrogenous fractions in vegetative tissue, 73
Peaches, 819
Pear fruits, stone cell formation, 587
Pears, influence of different quantities of moisture in heavy soil on rate of growth, 309
Peloric leaf formation, 185
Permanence of carotene and xanthophyll in canned pineapple, 190
Phases, biochemical, of oleoresin production, 537
osmotic quantities of plant cells in given, 115
Phenols, derivatives of, 137
Phosphorus, 717
phosphate, effect of soluble nitrogen, 362
Photoelectric apparatus for measuring leaf areas, 569
Photoperiod, effects on development of *Impatiens balsamea*, 545
Photosynthesis, 93
beginning of and the formation of chlorophyll, 401
BLACKMAN'S law of limiting factors and HARDER'S concept of relative minimum applied, 245
in *Grimmia montana*, 803
Physiology, of apple varieties, 49
plant, laboratory, 825
Phytometers, elongation and expansion in *Helianthus*, 637
Pigments, carotenoid, development in barley seedlings, 365
Pineapple plants, relationship between nitrogen fertilization and chlorophyll content, 159
xanthophyll, 187
Pine, longleaf, 537
slash, 537
Pisum sativum, calcium deficiency effects, 811
Pittsburgh meeting, 199
Plant cells, estimation of osmotic values of, 553
cells, osmotic quantities of in given phases, 115
containers, distribution of roots, 511
extracts, determination of amino nitrogen, 135
physiology, laboratory, 825
metabolism, effects of exfloration, 225
tissue, chemical analysis, 383
tissue, colorimetric determination of carotene, 325
tissue, isolation and determination of starch, 579
Plants, determining nitrogen, 355
effect of fuel oil, 817
growth, organic nitrogen fractions, and buffer capacity in relation to hardiness, 149
laboratory manual of cell and tissue physiology, SIEGFRIED STRUGGER, 824
pantothenic acid as a nutrilite, 559
prairie, osmotic pressure and water content, 661
relationship between nitrogen fertilization and chlorophyll content in pineapple, 159
rôle of asparagine and related substances in nitrogen metabolism, 447
sulphur content, 529
Plasmolytic method and estimation of osmotic values of plant cells, 553
PLITT, THORA M., Temperature as a predetermining factor in development of *Avena sativa*, 269
Polarity, electrical, 686
Polar tissues and cell oxidation, linkage between output of electric energy by, 27
Polysaccharides in sweet corn, 713
Porous plant containers, distribution of roots in, 511
Portraits, 201
GOEBEL, frontispiece opp. p. 203
GOEBEL, opp. p. 205
Potassium in corn tissues, 565
in external solution and pigment formation, 368
Potatoes, growth and yield in Florida, 465
Potential, bioelectric, at flux equilibrium, kinetics of an intracellular system, 681
Prairie plants, osmotic pressure and water content, 661

Precipitation with neutral lead acetate solution, 139
Predetermining factor, temperature as, in development of *Avena sativa*, 269
Premature flowering of citrus, 181
Preparation of tissue for extraction, 74
Preservation, 383
Pressure, osmotic, of prairie plants, 661
Principle of summation of cell E.M.F's, 209
Processes, soluble nitrogen as a measure of nitrogen available for anabolic, 355
Production of oleoresin, 537
Program committee, 200
Proof of the principle of summation of E.M.F's, 209
Prunes, sucrose content and dextrose-levulose ratio, 575

Q

Quantities, osmotic, of plant cells in given phases, 115
Quercus, 739, 795

R

Radiation, solar, and transpiration of *Helianthus annuus*, 341
Ratio, dextrose-levulose, of prunes, 575
Ratios, top-root, in containers, 511
Receptors of ammonia, organic acids as direct, 458
Reciprocal grafts, 411
Reduction of FEHLING'S solution before and after hydrolysis, 717
Regional section, 823
Relations, low temperature bibliography, R. B. HARVEY, 409
  water, reprints wanted, 201
Report, chemical methods committee, 409
  committee on chemical methods, 383
Reprints, cost, 201
Respiration, 93
  at flux equilibrium, kinetics of an intracellular system, 681
Response, change of tropic, 196
  to high and low nitrogen nutrient, 67
Reversibility of ice-formation and hardiness of alfalfa, 403
Review of biochemistry, annual, 584
Rhizomes, 733
Ricciocarpus natans, 559
ROBERTS, EDITH A., American ferns, 826
ROBERTS, R. H., Isolation and determination of starch in plant tissue, 579
ROHRMAN, EWALD, Pantothenic acid as a nutrilite for green plants, 559
Root formation on stem cuttings, hormones in relation, 789
Roots, 733
  and tops, comparative values, 675
  distribution in containers, 511
ROSENE, H. F., Linkage between output of electric energy by polar tissues and cell oxidation, 27
  Proof of the principle of summation of cell E.M.F.'s, 209
Rotation, optical, 716
Ruppia maritima, salt tolerance in lakes of high magnesium sulphate content, 425
RUSSELL, W. C., Colorimetric determination of carotene in plant tissue, 325

S

Salt concentration and hardiness of alfalfa, 403
  tolerance of *Ruppia maritima* in lakes of high magnesium sulphate content, 425
SAMISCH, R., Growth and seasonal changes in composition of oak leaves, 739
Sampling, 51, 383
  methods, 161
SAMPSON, A. W., Growth and seasonal changes in composition of oak leaves, 739
SANDSTROM, W. M. Biochemical laboratory methods, 410
SAYRE, J. D., Solubility of potassium in corn tissues, 565
Scion (stock) chemistry and fruiting relationships in apple trees, 483
Secretion, A. FREY-WYSSLING, 202
Section, Minnesota, 408
  New England, 582
  Purdue, 583
  regional, 823

Seed, growth modifications in citrus seedlings grown from x-rayed, 179
light as a factor influencing the dormancy of lettuce, 193
Seedlings, barley, development of the chlorophyll and carotenoid pigments, 365
citrus, grown from x-rayed seed, 179
toxicity of aluminum, 1
Senescence period, 749
Separation of glucose and fructose, 389
of pigments, 328
Severinia buxifolia, 413
SHIVE, J. W., Determinations of nitrogenous fractions in vegetative tissue of peach, 73
Shoots, chemical composition of terminal, 62
SHUCK, A. L., Light as a factor influencing dormancy of lettuce seeds, 193
SINGH, B. N., Limitations of BLACKMAN'S law of limiting factors and HARDER'S concept of relative minimum as applied to photosynthesis, 245
Siphons, capillary, 173
Slash pine, 537
SMITH, W. W., The course of stone cell formation in pear fruits, 587
Sodium chlorate in weed control, 699
Soil microbiology, 825
moisture as a factor influencing osmotic pressure, 671
Solar radiation and transpiration of *Helianthus annuus*, 341
Solubility of potassium in corn tissues, 565
Solutes, movement in the transpiration stream, 773
Solutions, nutrient, mechanism for controlled continuous flow, 169
Soy bean, 14, 225
Spectra, absorption, of alpha and beta carotenes and lycopene, 375
Stages of development, changes in nitrogen compounds in wheat grain, 499
Starch, 390
accumulation, 58
content of tree tissues, 488
disappearance and accumulation, 51
isolation and determination in plant tissue, 579
Statistical methods, R. A. FISHER, 202
Stem cuttings, hormones in relation to root formation, 789
STEPHEN HALES award, 200
STILES, H., Thermal conductivity of stored oats with different moisture content, 521
Stimulation and nutrilites, 562
St. Louis meeting, 408, 581, 823
Stock-scion chemistry and fruiting relationships of apple trees, 483
STODDART, L. A., Osmotic pressure and water content of prairie plants, 661
Stomata, 622, 653
of oaks, 795
Stone cell formation in pear fruits, 587
Storage studies, 604
Streamline flow and movement of solutes in transpiration stream, 773
Stream, streamline flow and movement of solutes in transpiration, 773
Structural modification of sunflower, 652
Structure, anatomical, 64
leaf, modification by x-rays, 753
mesophyll, 656
STRUGGER, SIEGFRIED, Praktikum der Zell- und Gewebephysiologie der Pflanze, 824
STUART, N. W., Determination of amino nitrogen in plant extracts, 135
Sucrose, content of prunes, 575
hydrolysis, 388
Sugar cane, 246
determinations, 388
Sulphate, magnesium, content, salt tolerance of *Ruppia maritima* in lakes of high, 425
Sulphur content of plants, 529
dioxide, 291
Summation of cell E.M.F's, 209
Summer meetings, 199, 407
Sunflower, 341, 613, 637, 753
structural modification, 652
Sunflowers, 414
Sweet corn, polysaccharides, physical and chemical properties, 713
Synthesis of asparagine from NH_3 and organic acids, 456
System, intracellular, for respiration and bioelectric potential at flux equilibrium, kinetics, 681

T

TAM, R. K., Relationship between nitrogen fertilizer and chlorophyll content in pineapple plants, 159
Tangerine, 179
TAYLOR, M. W., Colorimetric determination of carotene in plant tissue, 325
TELLER, G. L., Changes in nitrogen compounds in wheat grain at different stages of development, 499
Temperature, 151
  and assimilation, 260
  and CO_2 exchange, 96
  and living matter, JAN BĚLEHRÁDEK, 585
  as a predetermining factor in development of *Avena sativa*, 269
  effect on yield and grade of potato tubers, 475
  relations bibliography, low, R. B. HARVEY, 409
Temperatures, unfreezable and freezable water equilibrium in plant tissues as influenced by sub-zero, 781
Thermal conductivity of stored oats with different moisture content, 521
THOMAS, M. D., Absorption of sulphur dioxide by alfalfa and its relation to leaf injury, 291
TILDEN, JOSEPHINE E., The algae and their life relations, 825
Tissue, chemical analysis of plant, 383
  of peach, nitrogenous fractions in vegetative, 73
  physiology, 824
  plant, and starch, 579
  plant, colorimetric determination of carotene, 325
Tissues, corn, solubility of potassium in, 565
  polar, and output of electric energy, 27
Titanous chloride, effect on formation of chlorophyll in *Zea mays*, 821
Tolerance, salt, of *Ruppia maritima* in lakes of high magnesium sulphate content, 425
Tomatoes, 818
Tops and roots, comparative values, 675
Toxicity of aluminum on seedlings and action of certain ions in the elimination of the toxic effects, 1
Tradescantia, 793
Transpiration in *Helianthus annuus* and solar radiation, 341
  in *Helianthus annuus*, effect of artificial wind, 613
  of oaks, 795
  stream, streamline flow and movement of solutes, 773
Trees, apple, fruiting relationships, 483
Tropic response, change, 196
Twisting, 183

U

Unfreezable water equilibrium in plant tissues, 781
Urea formation and other means of removing NH_3, 459
URSPRUNG, ALFRED, Osmotic quantities of plant cells in given phases, 115

V

Values, estimation of osmotic, of plant cells, 553
Vegetative tissue of the peach, nitrogenous fractions in, 73
Vigor, relation of soluble nitrogen and phosphate phosphorus to plant, 362
Viscosity, 716

W

Water content of prairie plants, 661
  equilibrium in plant tissues, 781
  relations, reprints wanted, 201
Weed control and sodium chlorate, 699
WENT, F. A. F. C., obit, 584
Wheat, 150, 246
  grain, nitrogen compounds, 499
WILLCOX, O. W., Nations can live at home, 827
WILLIAMS, R. J., Pantothenic acid as a nutrilite for green plants, 559
Wind, effect of artificial on growth and transpiration in *Helianthus annuus*, 613

WORK, R. A., Influence of different quantities of moisture in heavy soil on rate of growth of pears, 309

X

Xanthophyll in pineapples, 187
X-rayed seed, growth modifications in citrus seedlings, grown from, 179
X-rays, modification of leaf structure, 753
Xylem formation, 58
formation and starch disappearance and accumulation, 51

Y

Yield of plants, relation of soluble nitrogen and phosphate phosphorus, 362
of potatoes in Florida, 465
YOCUM, L. E., The stomata and transpiration of oaks, 795

Z

Zea mays, formation of chlorophyll, 821
ZSCHEILE, F. P., Jr., Absorption spectra of alpha and beta carotenes and lycopene, 375